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Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (currently amended) A method for forming a bottom spin valve GMR sensor element with ~~ultra-thin~~ layers ~~of high density and smoothness and~~ having sub-atomic monolayers of oxygen absorbed on the surfaces thereof, comprising:

providing, in ~~an ultra-low base pressure~~ a sputtering chamber having a base pressure, a substrate;

forming on said substrate, using an ~~ultra-low pressure~~ Ar/O_2 mixture as a sputtering gas, a seed layer;

forming, using said sputtering gas, an antiferromagnetic pinning layer on said seed layer;

forming, using said sputtering gas, a synthetic antiferromagnetic (SyAF) pinned layer formed on said pinning layer;

forming, using only ~~ultra-low pressure~~ Ar as a sputtering gas, a Cu spacer layer on said SyAF layer, the surface of said spacer layer not contacting said SyAF layer then being treated with O_2 to form an oxygen surfactant layer (OSL);

forming, again using said ~~ultra-low pressure~~ Ar/O_2 mixture, a ferromagnetic free layer on the OSL of said treated spacer layer;

forming, using only ~~ultra-low pressure~~ Ar as a sputtering gas, a Ru capping layer on said ferromagnetic free layer, then forming an OSL layer on said Ru layer;

forming, using said ~~ultra-low pressure~~ Ar/O_2 mixture as a sputtering gas, a Ta capping layer on said Ru capping layer.

2.(original) The method of claim 1 wherein the sputtering chamber maintains a base pressure of approximately $5x10^{-9}$ torr.

3.(currently amended) The method of claim 1 wherein said ~~ultra-low pressure~~ Ar/O_2 mixture is produced by mixing ~~an ultra-low pressure~~ a source of high purity Ar containing oxygen in an amount less than 0.5 ppm, with the same Ar source to which between approximately 400 and 600 ppm of oxygen has been admixed, said high purity Ar being at an approximate pressure of 0.4 millitorr and said oxygen having therein a partial pressure of between approximately 10^{-9} and 10^{-8} torr.

4.(original) The method of claim 1 wherein said antiferromagnetic pinning layer is a layer of MnPt sputtered from a source of vacuum melted MnPt containing approximately 38% Mn by atomic weight, said layer being formed to a thickness between approximately 100 and 150 angstroms.

5. (original) The method of claim 1 wherein the synthetic antiferromagnetic (SyAF) pinned layer comprises a first layer of CoFe between approximately 17 and 21 angstroms thick, on which is formed a Ru coupling layer of approximately 7.5 angstroms thickness,

on which is formed a second layer of CoFe between approximately 18 and 22 angstroms thick.

6. (original) The method of claim 1 wherein the non-magnetic spacer layer is a layer of Cu between approximately 16 and 20 angstroms thick.

7.(original) The method of claim 1 wherein the OSL is formed by treating the Cu layer with an oxygen dose of approximately 10^{-4} torr.-sec in a separate chamber.

8.(original) The method of claim 1 wherein the ferromagnetic free layer is a double layer comprising a layer of CoFe between approximately 8 and 12 angstroms thick on which is formed a layer of NiFe between approximately 13 and 18 angstroms thick.

9.(original) The method of claim 1 wherein the Ru capping layer is formed between approximately 5 and 10 angstroms thick and an OSL is formed thereupon in a separate chamber.

10.(original) The method of claim 1 wherein the Ta capping layer is formed between approximately 10 and 3 0 angstroms thick.

11.(original) The method of claim 1 wherein said seed layer is a layer of NiCr, having 40% Cr by atomic weight and being formed to a thickness between approximately 35 and 45 angstroms.

12.(original) The method of claim 1 wherein said seed layer is a double layer, comprising a layer of NiFeCr having approximately 40% Cr by atomic weight and of thickness between approximately 35 and 40 angstroms on which is formed a layer of NiFe of thickness between approximately 7 and 10 angstroms.

Claims 13-21 are cancelled.